

REMARKS

Claims 1-10 were examined and reported in the Office Action. Claims 1-10 are rejected. Claims 1-16 remain. Claims 1 and 6 are amended. Attached hereto is a marked-up version of the amendments to the application as indicated above.

Applicants request reconsideration of the application in view of the following remarks.

I. 35 U.S.C. § 103(a)

A. Claims 6-10 are rejected in the Office Action under 35 U.S.C. § 103(a) as being unpatentable over US Patent No. 6,027,833 issued to Ueda et al. ("Ueda") in view of either US Patent No. 5,595,838 issued to Yamada et al. ("Yamada") or US Patent No. 6,337,159 issued to Peled et al. ("Peled") [equivalent to W096/27908 published September 12, 1996]. Applicants respectfully disagree.

According to MPEP 2142 "[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." (In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

Applicants' amended claim 6 contains the limitations of "...a carbon shell formed around the core, the carbon shell including carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure, and the carbon shell including a metal selected from the group of consisting of a transition metal, a semi-metal, an alkali metal and an alkali earth metal." Therefore, Applicants' claimed invention has a carbon shell that is

neither an amorphous structure nor a crystalline structure, but "an intermediate structure between an amorphous structure and a crystalline structure." Moreover, the carbon shell includes "carbon derived from amorphous carbon." Thus, Applicants' invention results in improved capacity and efficiency over the prior art.

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Ueda discloses a non-aqueous electrolyte secondary cell having a core made of crystalline graphite (carbon) structure. Ueda also discloses that a "low crystallinity or amorphous carbon layer 312 at least partially covering the core 311...." (Ueda, column 8, lines 9-13). Ueda does not disclose, teach or suggest a "carbon shell including carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure, and the carbon shell including a metal selected from the group of consisting of a transition metal, a semi-metal, an alkali metal and an alkali earth metal."

Yamada discloses a non-aqueous secondary battery arranged having "graphite-like planes [] arranged and stacked in an onion-like shell micro-texture ..." (Yamada, column 3, lines 44-49). Yamada does not disclose, teach or suggest a "carbon shell including carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure, and the carbon shell including a metal selected from the group of consisting of a transition metal, a semi-metal, an alkali metal and an alkali earth metal."

Peled discloses a non-aqueous electrochemical cell arranged having a synthetic passivating layer (SEI) being made of " MACO_3 , M_2CO_3 , alkali semi-carbonates, MAO , M_2O , MAS , M_2S and alkali-and alkaline-earth metal salts of surface carboxylic groups (M =alkali metal, MA =alkaline earth metal). The preferred metal ion for the synthetic SEI is lithium or at least it should be the major constituent with up to 30% (atomic) of another M or MA action, or their mixture." (Peled, column 4, lines 1-8). Peled does not disclose, teach or suggest a "carbon shell including carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure, and the

carbon shell including a metal selected from the group of consisting of a transition metal, a semi-metal, an alkali metal and an alkali earth metal."

Since neither Ueda, Yamada nor Peled, nor the combination of the three, disclose, teach or suggest all the limitations contained in Applicant's amended claim 6, as listed above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claim 6 is not obvious over Ueda in view of either Yamada or Peled since a *prima facie* case of obviousness has not been met under MPEP 2142. Additionally, the claims that directly or indirectly depend from Applicant's amended claim 6, namely claims 7-10, are also not obvious over Ueda in view of either Yamada or Peled for the above same reason.

B. Claims 1-5 are rejected in the Office Action under 35 U.S.C. § 103(a) as being unpatentable over Ueda in view of either Yamada or Peled, and in further view of US Patent No. 5,972,537 issued to Mao et al. ("Mao"). Applicants respectfully disagree.

Applicants' amended claim 1 contains the limitations of "... a carbon shell formed around the core, the carbon shell including carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure, and the carbon shell including a metal selected from the group consisting of a transition metal, an alkali metal and an earth metal."

As discussed above, neither Ueda, Yamada nor Peled, nor the combination of the three, disclose, teach or suggest a "carbon shell including carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure."

Mao discloses a method of fabricating a carbon material for use as an electrode in an electrochemical cell. Mao discloses that the "carbon materials are substantially amorphous [and they can also be] partially or completely crystalline or amorphous but possessing crystalline inclusions." (Mao, column 3, lines 6-10). Mao, however,

does not teach, disclose or suggest Applicant's amended claim 1 limitations of "carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure."

Since neither Ueda, Yamada, Peled, Mao, nor the combination of the four, disclose, teach or suggest all the limitations contained in Applicant's amended claim 1, as listed above, there would not be any motivation to arrive at Applicant's claimed invention. Thus, Applicant's amended claim 1 is not obvious over Ueda in view of either Yamada or Peled, and in further view of Mao since a *prima facie* case of obviousness has not been met under MPEP 2142. Additionally, the claims that directly or indirectly depend from Applicant's amended claim 1, namely claims 2-5, are also not obvious over Ueda in view of either Yamada or Peled, and in further view of Mao for the above same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claims 1-10 are respectfully requested.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely 1-16, patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR, & ZAFMAN

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By: 

Steven Laut
Reg. No. 47,736

CERTIFICATE OF FACSIMILE TRANSMISSION

12400 Wilshire Boulevard
Seventh Floor
Los Angeles, California 90025
(310) 207-3800

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office, BOX AF, Amendments, Commissioner for Patents, Washington, D.C. 20231, on December 18, 2002.


Linda D'Elia

December 18, 2002

Attachment: Version with markings to show changes made.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

The claims have been amended as follows:

1. (Twice Amended) A negative active material for a rechargeable lithium battery comprising:

a core including crystalline carbon, amorphous carbon or a mixture thereof;
and

a carbon shell formed around the core, the carbon shell including carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure, and the carbon shell including with a metal selected from the group consisting of a transition metal, an alkali metal and an earth metal, ~~the carbon shell being an intermediate structure between an amorphous structure and a crystalline structure.~~

6. (Amended) A negative active material for a rechargeable lithium battery comprising:

a core including secondary particles, the secondary particle being prepared by agglomerating at least one primary particle of a crystalline carbon, an amorphous carbon or a mixture thereof; and

a carbon shell formed around the core, the carbon shell including carbon derived from amorphous carbon and having an intermediate structure between an amorphous structure and a crystalline structure, and the carbon shell including with a metal selected from the group of consisting of a transition metal, a semi-metal, an alkali metal and an alkali earth metal.